REMARKS

The claims have been amended as follows. Claims 8, 10, and 11 have been amended to remove an inadvertent error introduced into the claims. Claim 23 has been canceled. Claims 23-26 have been renumbered and amended accordingly. Claim 23 has been amended by more clearly defining the preamble and the image applied onto the substrate. Futhermore, the term "printing" has been changed to "bonding". This is supported on page 17, paragraph [057], which states that a bonding method can be printing. Claims 27 and 29 have been canceled. Claims 28 and 30-37 have been renumbered and amended accordingly. There are now 34 claims in the application. No new subject matter has been introduced by these amendments.

Drawings

The Examiner has objected to the drawings under 37 CFR 1.83(a) for failing to show every feature of the invention specified in the claims. Specifically, the Examiner states that the features recited in claims 7-11, namely the additional layer and opaque layer of the barrier screen, and the apertures being thinner, are not shown in the drawings.

The terms "opaque layer" and "additional layer" in claims 7-11 have inadvertently been inverted. However, these claims have now been amended and all of the features can be seen in figure 5.

Claim 7 recites a barrier screen having at least one opaque layer and an additional layer, both of these layers having clear, staggered apertures. Figure 5 of the present application clearly shows an opaque layer (4a) and an additional layer (4b). Both layers (4a and 4b) have clear staggered apertures (21a and 21b).

Claim 8, as amended, states that the opaque layer has a back side covered in a dark material. This is shown in figure 5, where 4a has a black back side.

Claim 9 states that the dark material is black ink. This is described in the specification in reference to the back back side of the opaque layer.

Claim 10, as amended, states that the additional layer has a back side covered by a highly reflective material. While this cannot be seen explicitly in the figure, the description clearly states that this side is potentially covered in a highly reflective material. It would not be possible to show this in the figures.

Claim 11, as amended, states that the apertures in the opaque layer are thinner than the apertures in the additional layer. This can be seen on figure 5, where the apertures of the top layer (4a) are thinner than those on the bottom layer (4b).

Therefore, the Applicant respectfully requests withdrawal of the objection to the drawings.

Claim Rejections – 35 U.S.C. §112

Claims 1-17 are rejected under 35 U.S.C. 112(1) for failing to comply with the enablement requirement. Specifically, the Examiner states that the specification and claims fail to teach how an image and a parallax barrier as recited in claims 1, 17, and 24 are able to generate auto-stereo three-dimensional views from a plurality of points of view. The Applicant respectfully traverses this rejection for the following reasons.

Claim 1 is directed towards an apparatus for generating auto-stereo three-dimensional views from a plurality of points of view. The apparatus comprises: an image on a substrate, the image containing dark separation lines between cells and the substrate being of a medium of sufficient transparency to allow light therethrough; a light source for illuminating the image; and a slit-type barrier screen placed in front of the image to provide a parallax effect, the barrier screen consisting of a substantially opaque surface with clear, staggered apertures through which light can pass from a first side to a second side; wherein the dark separation lines of the image have a rippled shape corresponding to said staggered apertures and prevent image bleeding between the cells.

Claim 1 structurally defines the elements of the apparatus in accordance with the present invention and as described in the detailed description of the preferred embodiment. As stated in paragraph [034] starting on page 7 of the present application, "The apparatus provides a plurality of points of view, which in turn allows many viewers to simultaneously visualize a high quality auto-stereo or "real" 3-D color image. Unless standing in the same spot, each viewer, while actually seeing the same overall scene, will also see different information. The method and apparatus of the present invention ensure that the information coming through a given slit in a slit-type barrier screen comes from only one cell and not from any adjacent cell." "The image used is made up of a plurality of cells, each cell being composed of a plurality of pixels." (page 7, paragraph [033]). " [The Apparatus] contains at least one highly efficient light source 1 placed on the back panel." (page 8, paragraph [035]. "The 3-D cast 6 comprises a barrier screen 4, the barrier screen 4 having a first side and a second side and defining a multitude of apertures 21 through which light may pass from said first side to said second side. The 3-D cast 6 also comprises a spacer 3 and a computer-processed image 2." (page 8, paragraph [035]).

The specification then goes on to explain how the apparatus works: "The light source 1 generates light onto the back of the translucent computer-processed image 2. Light projected by the light source 1 selectively passes through the translucent computer-processed image 2 that contains all of the available points of view, the transparent spacer 3 and the slits 21 of the barrier screen 4." (page 9, paragraph [035]). "Multiple points of view (figure 3) are formed from individual slits 21. When viewers 5 look through individual slits 21, a relationship is created between the points of view 10a to 10d and the corresponding information 9a to 9d on the computer-processed image 2." (page 1, paragraph [040]). "In general, the barrier screen 4 is a parallax or "slit"-type barrier screen (figure 4). The barrier screen 4 is generated using efficient tools such as computers and self-developed and/or pre-packaged software." (page 11, paragraph [041]).The relationships defined in paragraph [047], pages 13-14, demonstrate how the barrier screen is constracted in order to produce the desired effect.

"When the image is seen through each vertical slit 21 of the barrier screen 4, only a portion of the information will pass thus making the overall result a highly coherent and smooth image for each of the horizontal points of view 10a-d (FIG. 3). The combination of the images from the tens of thousands of consecutive points of view 10a-d can be arranged so it can generate either a high quality color "real" 3-D auto-stereo static image; a high quality color "real" 3-D auto-stereo partially animated image; any other type of image effect where the various points of view 10a-d need different independent images. [...] When the computer-processed image 2 and an efficient light source 1 are combined the scene can then be displayed using a CRT, plasma, LCD, or any other type of video display unit." (pages 16-17, paragraph [055]).

An extensive description of how the image is generated is included in the description: "Various methods can be used to generate the computer-processed image 2. Three such methods are described herein, these methods being used with the VIEWS™ assembly software." (page 19, paragraph [060]). A detailed description of the three methods is provided in paragraphs [060]-[068].

In view of the above, it is respectfully submitted that claim 1 is fully enabled by the specification. A person skilled in the art can fully understand how to generate the auto-stereo three-dimensional views from a plurality of points of view.

Claim 17 is directed to a method for providing auto-stereo three-dimensional views from a plurality of points of view. The method comprises: providing an image on a substrate made of a medium of sufficient transparency to allow light therethrough, the image being made up of a plurality of cells; placing a barrier screen in front of the image to provide a parallax effect, the barrier screen consisting of an optical arrangement providing apertures through which light can pass, each of the apertures defining a window onto one of the plurality of cells and configured such that a view of a neighboring cell is obstructed from all of the points of view; and illuminating the image using a light source.

As stated above for the apparatus claim, the specification clearly indicates the steps of providing each of the elements of the apparatus, and then goes on to describe the functioning of the apparatus. The components of the barrier screen are described and the interaction between the different elements are fully explained. Furthermore, the methods used to generate the image are described in detail. Therefore, the Applicant believes the specification fully enables a person skilled in the art to understand claim 17 of the present application.

Claim 23, which contradicted claim 17, its base claim, has been canceled.

The Examiner states the following on page 3 of the official action: "The **criterion** for the apparatus or method to be able to generate auto-stereo three dimensional views is to have the *image* comprises (sic) *image pairs* of different perspectives for the right eye view and left eye views **respectively** and to have the different perspective images to be *directed* by the parallax barrier to corrected eye (i.e. left eye perspective image to left eye and right eye perspective image to right eye, **respectively**)." This is correct and is fully met by the present invention. As illustrated in figure 3, an eye positioned at a specific location will be receiving a certain point of view, or perspective. Therefore, the right eye and left eye will have respective views, directed through the slits of the barrier screen. The pair of views will create a three-dimensional image for the viewer.

Therefore, the Applicant respectfully requests that the 112(1) rejection concerning claims 1-17 be withdrawn.

Claims 1-37 are objected to for various informalities. The first informality is the term "cell" in claims 1, 17, and 24. As stated above, "The image used is made up of a plurality of cells, each cell being composed of a plurality of pixels." (page 7, paragraph [033]). Furthermore, as stated in paragraph [034] starting on page 7 of the present application, "The apparatus provides a plurality of points of view, which in turn allows many viewers to simultaneously visualize a high quality auto-stereo or "real" 3-D color image. Unless standing in the same spot, each viewer, while actually seeing the same overall scene, will also see different information that would otherwise be hidden by other objects that make up the overall image. [...] The method and apparatus of the present invention ensure that the information coming through a given slit in a slit-type barrier screen comes from only one cell and not from any adjacent cell." "In a preferred embodiment, the individual cells in the image are delimited by generating the image to have each cell isolated. A rippled opaque line 45 (figure 7) is drawn on the top and bottom of each slit 21 along a horizontal row of cells, thus separating and/or isolating the rows of cells from each other. This feature eliminates the vertical distortions perceived when the viewer observes the 3D image past a certain vertical angle." (page 15, paragraph [052]). From these passages of the specification, it is understood that each cell regroups a plurality of pixels to form many points of view. More than one point of view is present in each cell. In one of the methods used to generate the image, each cell of the image that will be behind a slit of the barrier-screen is created by selecting every pixel that can be seen when standing in a specific position. Therefore, it is respectfully submitted that the term "cell" in the claims should be fully understood from the specification.

The Examiner states that claims 7-11 and 33-37 are unclear with respect to what is the front side and what is the back side. Claims 7-11 have been amended accordingly to properly orient the front and back side.

With respect to claims 33-37, now renumbered to 30-34, the Applicant believes the claims to be sufficiently clear for a person skilled in the art to understand. The base claim, claim 23, recites bonding onto a first side of a substrate an image, and bonding on a second side of the substrate a barrier screen. It is clear that the substrate only has two sides and therefore, one side holds the image and the other side holds the barrier screen. Claim 31 states that printing onto a second side comprises using highly reflective material. This makes reference to the printing of the barrier screen and does not cause any confusion as to which side is being refered to. Claim 32 further defines bonding onto a second side as printing a first layer and printing a second layer. Again, there is no confusion as to which side is being referred to, namely, the side with the barrier screen. Claim 33 states that bonding the second layer comprises printing using black ink. This clearly refers to the second layer used in the barrier screen. Claim 34 states that bonding the first layer comprises printing using a highly reflective material. This refers to the first layer which makes up part of the barrier screen. Claim 35 states that printing a first layer and printing a second layer comprises providing apertures in the second layer that are thinner than apertures in the first layer. There is no reference to a first side or a second side in this claim.

Furthermore, claim 23, as amended, is directed towards a method of manufacturing a portion of an apparatus for three-dimensional auto-stereo image to be used with a light source in order to produce the auto-stereo image. The claim describes how to manufacture the portion of the apparatus. The specification teaches how to use the manufactured image with the light source to produce the three-dimensional auto-stereo image, namely in paragraph [070] on page 23.

Therefore, withdrawal of the §112 rejection with respect to claims 1-37 is requested.

35 U.S.C. §102

Claims 1-4 and 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by patent number 5,949,390 to Nomura et al. This rejection is respectfully traversed for the following reasons.

Nomura describes a three-dimensional display apparatus which includes a liquid crystal panel and a slit panel having a convex lens function in a horizontal direction and a plurality of slits arranged in a zig-zag manner, which is disposed in front of the liquid crystal panel. The slits on the barrier screen are arranged in rows which are offset one from the other.

Unlike Nomura, claim 1 of the present application recites "an image on a substrate, the image containing dark separation lines between cells" and "wherein said dark separation lines of said image have a rippled shape corresponding to said staggered apertures and prevent image bleeding between said cells". As explained above, the cells on the image contain a plurality of pixels which form 2-D images. While Nomura describes staggering the slits in the barrier, it does not describe any type of dark separation lines between cells **on the image**. These dark separation lines, an example of which is shown in figure 7 of the present application, prevent a viewer from receiving information from more than one cell in an eye from a specific position.

The Examiner has misunderstood the zig-zag slits on the barrier screen to be the same as the rippled separation lines on the image between the cells. These two features are not the same and are not equivalents of each other. They do not perform the same function, are not located in the same place, and are not produced the same way. Therefore, Nomura et al. does not anticipate claim 1.

Claim 17 recites the "image being made up of a plurality of cells", and "placing a barrier screen in front of said image to provide a parallax effect, said barrier screen consisting of an optical arrangement providing apertures through which light can pass, each of said apertures defining a window onto one of said plurality of cells and **configured such that a view of a neighboring cell is obstructed from all of said points of view**". This feature is not described by Nomura in any way. The staggered slits in the barrier do not prevent image bleeding between cells. Therefore, Nomura et al. does not anticipate claim 17.

Claims 24-28 are rejected under 35 U.S.C. 102(b) as being anticipated by reissued patent Re. 35,029 to Sandor et al. This rejection is respectfully traversed for the following reasons.

Sandor describes a method of making autostereo-graphic images of an object comprising the steps of imputing to a computer a predetermined number of planar images of the object, each of the planar images being a view of the object, from one of the predetermined number of different viewpoints; interleaving the predetermined number of planar images in the computer; and printing the interleaved images with a high-resolution output imaging device on a spacer, a selected edge of each interleaved image being aligned with a predetermined direction on the spacer.

Claim 23, as amended, is directed towards a method of manufacturing a portion of an apparatus for three-dimensional auto-stereo image to be used with a light source in order to produce the auto-stereo image, the method comprising printing onto a first side of a transparent substrate an image having a plurality of cells making up the image, the image containing dark separation lines between the cells, the dark separation lines of the image have a rippled shape to prevent image bleeding between the cells, and printing onto a second side of the transparent substrate a barrier screen in order to get a desired effect.

Sandor et al. does not teach or suggest that the image have dark separation lines in a rippled shape between the cells making up the image. Sandor et al. does not provide a way to prevent image bleeding between the cells and therefore, claim 23 is not anticipated by the cited reference.

Claim Rejection – 35 U.S.C. §103

Claims 29-31 and 33-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over reissued patent to Sandor (Re. 35,029) in view of the patents issued to Van Berkel (US 6,118,584) and Nomura (US 5,949,390). This rejection is respectfully traversed for the following reasons.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issue to Sandor et al.

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the reissued patent to Sandor et al in view of the patents issued to Van Berkel and Nomura.

Van Berkel describes an autostereoscopic display apparatus which includes a matrix display panel having display elements in rows and columns and arranged in groups of at least three adjacent display elements, and an optical director in the form of, for example, a lenticular screen overlying the panel and having lenticules extending in the column direction with each lenticule overlying an associated display element group, in which adjacent display elements in a group are arranges so as to partly overlap one another in the column direction (Y).

Van Berkel does not teach or suggest the use of any means to prevent bleeding in between cells.

Neither Nomura, Sandor, or Van Berkel teach or suggest the dark separation lines recited in claims 1 and 23, wherein the rippled effect prevents bleeding in between cells on the image. Furthermore, the cited references do not teach or suggest having the cells configured such that a view of a neighboring cell is obstructed from all of the points of view, as recited in claim 17. Therefore, claims 1-22 (previously 1-23), 27-28 (previously 29-31), 29 (previously 32), and 30-34 (previously 33-37) are not obvious in view of the cited art.

In view of the foregoing, the Applicants believe the present application to be patentable and early and favorable notice is earnestly solicited.

Respectfully submitted,

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